

Serial No. 10/708,860
Hiroyuki Akatsu et al.

This listing of claims replaces all prior versions and listings of claims in the application.

In the Claims:

1. (currently amended) A bipolar transistor, comprising:

a collector layer;

an intrinsic base layer overlying said collector layer;

a low-capacitance region laterally adjacent to said collector layer including at least one of a dielectric region and a void disposed in an undercut directly underlying said intrinsic base layer;

an emitter layer overlying said intrinsic base layer; and

a raised extrinsic base layer overlying said intrinsic base layer.

2. (currently amended) ~~A bipolar transistor as claimed in claim 1, wherein said dielectric region includes~~A bipolar transistor, comprising:

a collector layer;

an intrinsic base layer overlying said collector layer;

a low-capacitance region laterally adjacent to said collector layer including a void disposed in an undercut underlying said intrinsic base layer;

an emitter layer overlying said intrinsic base layer; and

a raised extrinsic base layer overlying said intrinsic base layer.

3. (original) A bipolar transistor as claimed in claim 1, wherein said low-capacitance region includes at least one of a void and a solid dielectric region contacting said collector layer.

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4. (original) A bipolar transistor as claimed in claim 3, wherein said intrinsic base layer is surrounded by said dielectric region.
5. (original) A bipolar transistor as claimed in claim 1, wherein said raised extrinsic base layer is self-aligned to said emitter layer.
6. (original) A bipolar transistor as claimed in claim 5, wherein said raised extrinsic base layer is spaced from said emitter layer by a first spacer having a sidewall wholly in contact with said raised extrinsic base layer and a second spacer overlying said first spacer, said second spacer having a sidewall wholly in contact with said emitter layer.
7. (original) A bipolar transistor as claimed in claim 1, wherein said collector layer has a dopant concentration of about 10^{20} cm^{-3} .
8. (original) A bipolar transistor as claimed in claim 1, further comprising a subcollector disposed below said collector layer, and a trench isolation region surrounding peripheral edges of said subcollector.
9. (original) A bipolar transistor as claimed in claim 1, wherein said intrinsic base layer includes a layer of a single-crystal semiconductor material which forms a heterojunction with a material of at least one of said emitter layer and said collector layer.
10. (original) A bipolar transistor as claimed in claim 1, wherein said single-crystal semiconductor material layer included in said intrinsic base layer includes silicon germanium.
- 11-20. (cancelled)

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21. (new) A bipolar transistor as claimed in claim 2, wherein said low-capacitance region further includes a solid dielectric region, wherein at least one of said void or said solid dielectric region contacts said collector layer.

22. (new) A bipolar transistor as claimed in claim 21, wherein said intrinsic base layer is laterally surrounded by said solid dielectric region.

23. (new) A bipolar transistor as claimed in claim 2, wherein said raised extrinsic base layer is self-aligned to said emitter layer.

24. (new) A bipolar transistor as claimed in claim 23, wherein said raised extrinsic base layer is spaced from said emitter layer by a first spacer having a sidewall wholly in contact with said raised extrinsic base layer and a second spacer overlying said first spacer, said second spacer having a sidewall wholly in contact with said emitter layer.

25. (new) A bipolar transistor as claimed in claim 2, wherein said collector layer has a dopant concentration of about 10^{20} cm^{-3} .

26. (new) A bipolar transistor as claimed in claim 2, further comprising a subcollector disposed below said collector layer, and a trench isolation region surrounding peripheral edges of said subcollector.

27. (new) A bipolar transistor as claimed in claim 2, wherein said intrinsic base layer includes a layer of a single-crystal semiconductor material which forms a heterojunction with a material of at least one of said emitter layer and said collector layer.

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28. (new) A bipolar transistor as claimed in claim 2, wherein said single-crystal semiconductor material layer included in said intrinsic base layer includes silicon germanium.